

## CLAIMS

What is claimed is:

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1. A method of transmitting data over a network having a plurality of nodes and links when a link has failed, the method comprising:
- receiving a data packet at a first node having a failed link, the data packet scheduled to use the failed link;
- routing the data packet to a failover storage area;
- if needed, determining an alternative link for the data packet and routing the data packet to a transmitter associated with the alternative link;
- 10 and
- transmitting the data packet to a receiver for the alternative link in a second node, thereby allowing the data packet to reach an intended destination by effecting the first node at a hardware level and without software intervention.
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2. A method as recited in claim 1 further comprising:
- detecting a specific link failure at the first node; and
- switching the first node to failover mode for the specific link.
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3. A method as recited in claim 2 further comprising:
- notifying a third node at the far-end of the specific link of the failure;
- and
- switching the third node to failover node for the specific link.
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4. A method as recited in claim 1 further comprising converting the data packet to a failover data packet at the first node by marking the data packet as a failover packet and recomputing a CRC value.
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5. A method as recited in claim 4 further comprising examining one or more failover route tables using a destination node identifier as an index and retrieving the alternative link.
6. A method as recited in claim 5 further comprising querying a primary route table using the destination node identifier to retrieve a primary link.

7. A method as recited in claim 6 further comprising querying a secondary route table to retrieve the alternative link if the primary link is a failed link.

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8. A method as recited in claim 1 further comprising storing the data packet in a failover buffer when received at the first node and before routing the data packet to a failover storage area.

10 9. A method as recited in claim 1 wherein routing the data packet to a failover storage area further comprises routing the data packet to a first data stack or a second data stack.

15 10. A method as recited in claim 9 further comprising determining whether the data packet is routed to the first data stack or to the second data stack.

20 11. A method as recited in claim 9 wherein the first data stack receives data packets from receivers and transmitters and the second data stack receives data packets from receivers only.

25 12. A method as recited in claim 9 further comprising forwarding the data packet from the failover storage area to the selected transmitter for the alternative link.

13. A method as recited in claim 9 further comprising sending out the data packet from the selected transmitter without storing the data packet in a buffer for the selected transmitter.

30 14. A method as recited in claim 1 further comprising sharing only the alternative link at the first node in order to transmit the data packet to the second node.

35 15. A method as recited in claim 1 further comprising determining whether the second node is in failover mode after the second node receives the data packet from the first node on the alternative link.

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16. A node in a communication network comprising:  
a receiver having a failover buffer for routing a failover data packet;  
a first-in, first-out (FIFO) data storage area for storing the failover data packet and routing the data packet to a receiver or a transmitter; and  
a node/link routing table having at least two rows, a row corresponding to a neighboring node, and one or more interconnect links, wherein a failure in a link connected to the node will not disrupt the flow of a data packet scheduled to use the link.
17. A node as recited in claim 16 wherein the receiver further comprises a multiplexer for routing the failover data packet to the failover buffer.
18. A node as recited in claim 16 wherein the FIFO data storage area further comprises a first FIFO data stack, a second FIFO data stack, and a plurality of multiplexers.
19. A node as recited in claim 18 wherein the first FIFO data stack outputs data to a transmitter and accepts input data from a receiver and a transmitter and the second FIFO data stack outputs data to a transmitter and a receiver and accepts input data from a receiver.
20. A node as recited in claim 16 wherein the node/link routing table further comprises a first column for storing a node identifier and a second column for storing a transmitter identifier.
21. A node as recited in claim 16 further comprising a transmitter having an arbitrator for determining whether a normal data packet or a failover data packet will be transmitted on a link.
22. A node as recited in claim 21 wherein the arbitrator is a multiplexer and selection control logic.

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